

WHAT IS CLAIMED IS:

1. A process for determining useful properties of individual building blocks of a material library comprising a substrate having at least two individual building blocks in at least two sections which are separated from one another, which comprises:
 - (iii) simultaneous measurement of a first parameter at at least two sections with a first sensor, the first parameter giving an indication of a first property of the respective building blocks, and
 - (iv) measurement of at least one further parameter with at least one further sensor, the further parameter giving an indication of a further property of the respective building blocks.
2. The process according to Claim 1, wherein the at least one further parameter is measured only for a selected group of sections, the choice of a section for measuring the at least one further parameter depending on the respective result of the measurement of the first parameter.
3. The process according to Claim 1, which comprises the following further preceding step (i):
 - (i) production of a material library comprising a substrate having at least two individual building blocks in at least two different substrate sections which are separated from one another.
4. The process according to Claim 1, which comprises the following further step (ii) before step (iii):
 - (ii) introduction of at least one starting material into at least two substrate sections which are separated from one another of a material library for carrying out a chemical or physical or chemical and physical conversion of the starting material in the at least two substrate sections separated from one another, in each case in the presence of the

corresponding building block, obtaining in each case an effluent stream containing at least one conversion product and/or starting material.

5. The process according to Claim 3, which comprises the following further step (ii) after step (i):

(ii) introduction of at least one starting material into at least two substrate sections which are separated from one another of a material library for carrying out a chemical or physical or chemical and physical conversion of the starting material in the at least two substrate sections separated from one another, in each case in the presence of the corresponding building block, obtaining in each case an effluent stream containing at least one conversion product and/or starting material.

6. The process according to Claim 2, wherein the sections for the further measurement are automatically selected by a data processing system.

7. The process according to Claim 1, wherein the first parameter is a temperature or a temperature change, and infrared thermography via the first sensor provides measurement of the temperature or temperature changes.

8. The process according to Claim 1, wherein the first parameter is a temperature or temperature change, and the temperature of individual sections is measured via a thermocouple.

9. The process according to Claim 1, wherein the first sensor is an infrared camera which determines a temperature of the sections in an integrated manner.

10. The process according to Claim 1, wherein the first sensor is based on colour detection using a chemical indicator.

11. The process according to Claim 1, wherein the further parameter is measured in an effluent stream of selected sections.

12. The process according to Claim 11, wherein the at least one further sensor is utilized in a method which is selected from the group consisting of mass spectrometry, gas chromatography, gas chromatography/mass spectroscopy, Raman spectroscopy, and FT-IR spectroscopy.
13. The process according to Claim 12, wherein the respective effluent stream of the selected sections is passed to the at least one further sensor via a pipe which is positioned in the effluent stream of the selected sections by a driver.
14. The process according to Claim 13, wherein the effluent stream of the selected sections is passed via a sniffing capillary.
15. The process according to Claim 13, wherein the driver is controlled automatically by a data processing system.
16. The process according to Claim 1, wherein the substrate is a tube bundle reactor or heat exchanger and the sections are channels or tubes.
17. The process according to Claim 1, wherein the substrate is a block of a solid material which has regions.
18. The process according to Claim 17, wherein the substrate is a block of a solid material which has channels.
19. The process according to Claim 1, wherein the at least two individual building blocks have catalytic properties and are present in each case as catalyst bed, tube-wall coating or auxiliary support coating.
20. The process according to Claim 19, wherein the at least two individual building blocks are heterogeneous catalysts and/or their precursors.

21. The process according to Claim 19, wherein the at least two individual building blocks are inorganic heterogeneous catalysts and/or their precursors.

22. The process according to Claim 19, wherein the at least two individual building blocks are solid catalysts or supported catalysts and/or their precursors.

23. The process according to Claim 19, wherein the first property is the respective activity of the building blocks.

24. The process according to Claim 23, wherein the second property is the respective selectivity of the building blocks.

25. The process according to Claim 4, wherein the conversion is selected from the group consisting of decomposition of nitrogen oxides, the synthesis of ammonia, the oxidation of ammonia, oxidation of hydrogen sulphide to sulphur, oxidation of sulphur dioxide, direct synthesis of methylchlorosilanes, oil refining, oxidative coupling of methane, methanol synthesis, hydrogenation of carbon monoxide and carbon dioxide, conversion of methanol to hydrocarbons, catalytic reforming, catalytic cracking and hydrocracking, coal gasification and liquefaction, heterogeneous photocatalysis, synthesis of ethers including MTBE and TAME, isomerizations, alkylations, aromatizations, dehydrogenations, hydrogenations, hydroformylations, selective or partial oxidations, aminations, halogenations, nucleophilic aromatic substitutions, addition and elimination reactions, dimerizations, oligomerizations and metathesis, polymerizations, enantioselective catalysis and biocatalytic reactions.

26. An apparatus for determining useful properties of individual building blocks of a material library, comprising:

a substrate adapted to receive at least two individual building blocks and having at least two different sections which are separated from one another;

an inlet to introduce at least one starting material;

a first sensor for measuring a first parameter;

at least one further sensor for measuring a second parameter; and

a data processing device which selects sections for measuring the at least one further parameter on a basis of results of measurement of the first parameter according to criteria determined in advance of measurement.

27. The apparatus according to Claim 26, wherein the first sensor is an infrared camera.

28. The apparatus according to Claim 26, wherein the at least one further sensor includes a sensor used in a method which is selected from the group consisting of mass spectrometry, gas chromatography, gas chromatography/mass spectroscopy, Raman spectroscopy, and FT-IR spectroscopy.

29. The apparatus according to Claim 28, in which the at least one further sensor includes a quadrupole mass spectrometer.

30. The apparatus according to Claim 26, further comprising:
a sniffing capillary for feeding an effluent stream of a section to the at least one further sensor; and
a driver for positioning the sniffing capillary for receiving the effluent stream of one section under study.

31. The apparatus according to Claim 18, wherein the substrate has a planar arrangement having a wire grid or foamed ceramic.

32. The apparatus according to Claim 26, further comprising:
a housing in which the substrate is disposed.

33. The apparatus according to Claim 32, wherein the apparatus comprises a temperature controller for heating the housing and/or cooling the housing.

34. The apparatus according to Claim 32, wherein the housing has an IR-transparent window, and the first sensor is an infrared camera disposed outside the housing in front of the IR-transparent window.

35. The apparatus according to Claim 26, wherein the substrate comprises a block made of electrically conducting material exhibiting sections having a channel-form, the block being adapted to be heated by resistance heating.

36. The apparatus according to Claim 35, wherein the substrate includes a plurality of channels, wherein each channel comprises a carrier.

37. The apparatus according to Claim 36, wherein the carrier is synthesized into the channels.

38. The apparatus according to Claim 36, wherein the carrier and/or the channel comprises at least one building block.

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JAN 11 2011
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